reactive insulin was almost completely cleared within 1 hr. After intratracheal insulin administered by aerosol, the circulating plasma immunoreactive insulin showed a significant rise and there was a sustained decline in the plasma glucose level.

The bioavailability calculated from the area under the plasma immunoreactive insulin curves after intratracheal aerosol administration of about 2.5 U of insulin/kg was almost the same as that after intravenous injection of 1 U/kg. Wigley *et al.* (5) reported that the plasma immunoreactive insulin area with aerosol delivery of about 3 U/kg was 7–16% of that after intravenous injection of 0.2 U/kg. This low bioavailability might depend on many factors such as adherence to the glass nebulizer, the mouth, and the throat. Our results indicated that most of the insulin (~40%) delivered directly into the trachea in an aerosol formulation is absorbed into the bloodstream through the epithelial layer of the respiratory tract. Accordingly, if an aerosol formulation could be administered directly into the trachea, it could be an effective tool for clinical applications of proteins and peptides.

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BOOKS

REVIEWS

Analysis of Drugs and Metabolites by Gas Chromatography–Mass Spectrometry. Vol. 1: Respiratory Gases, Volatile Anesthetics, Ethyl Alcohol, and Related Toxicological Materials; Vol. 2: Hypnotics, Anticonvulsants, and Sedatives; Vol. 3: Antipsychotic, Antiemetic, and Antidepressant Drugs; Vol. 4: Central Nervous System Stimulants; Vol. 5: Analgesics, Local Anesthetics, and Antibiotics. By BENJAMIN J. GUDZINOWICZ and MICHAEL J. GUDZINOWICZ. Dekker, 270 Madison Avenue, New York, NY 10016, Vol. 1: 1977, 223 pp., 15 × 23 cm, Price $23.75; Vol. 2: 1977, 493 pp., 15 × 23 cm, Price $45.00; Vol. 3: 1977, 268 pp., 15 × 23 cm, Price $29.75; Vol. 4: 1978, 458 pp., 15 × 23 cm, Price $45.00; Vol. 5: 1978, 541 pp., 15 × 23 cm, Price $55.00.

The above titles are the first five volumes in what the publisher promises to be a continuing series. Indeed, the flyleaf of Volume 5 states that Volume 6 will cover cardiovascular, antihypertensive, hypoglycemic, and thyroid-related agents. The stated purposes of this series are: to provide a chronological literature compilation of the GLC and GLC–mass spectrometry procedures for the analysis of specific drugs and their metabolites; to provide qualitative and quantitative procedures in such detail that they might be reproduced "faithfully" in the reader's laboratory; to present the results, precision, accuracy, and limits of detection achieved by a given procedure; and to indicate, wherever possible, the procedure's applicability to pharmacokinetic studies.

Each volume has a separate author and subject index. These indexes are not cumulative, but that is not necessary since each volume is self-contained. The authors assume that the reader is familiar with GLC and GLC–mass spectrometry. No pages are wasted on cursory introductory chapters, although the authors do include a few sketches of special instrument modifications such as sampling traps and injection ports. Where appropriate, the chemistry of a chemical class is described in an expanded discussion, which usually contains the structures and sometimes the biotransformations. Each chapter contains representative GLC tracings and tabulated retention data. Some mass spectra or printouts of mass fragment values are presented.

A logical question is: Does this series duplicate or overlap *Analytical Profiles*? To a limited extent, the answer is yes, only because GLC and mass spectra analyses are found in *Analytical Profiles*. Whereas the latter deals more with the pure drug, *Analysis of Drugs and Metabolites by Gas Chromatography–Mass Spectrometry* emphasizes the analysis of mixtures that include the specific drugs under discussion. The two series complement each other, and the volumes covered in this review discuss a much larger group of compounds.

Volume 1 consists of two chapters of about equal length. The first chapter discusses respiratory gases, volatile anesthetics, and related toxicological materials. The second includes sterilizing agents, common organic solvents found in blood, and riot-control aerosol irritants. The second chapter also features ethanol and volatile trace components in breath, body fluids, and body tissues. The term "volatile" may be a little misleading, because the discussion on urine includes screening of urinary steroids and acids plus other chemicals.

The topics become more pharmaceutically oriented in the remaining volumes. About half of Volume 2 is devoted to barbiturates. One-third of the volume is a chapter that includes chloral derivatives, tertiary acetylenic alcohols, cyclic ethers, carbamates and ureides, piperdinediones, quinazalones, benzodiazepines, and carbamazepine. The third and final chapter makes up about 20 percent of the book and covers the traditional anticonvulsants including hydantoins, succinimides, primidone, paramethadione and trimethadione, and some miscellaneous anticonvulsants.

Volume 3 has two chapters of about equal length. Chapter 1 covers phenothazines, butyrophenones, and thioxanthines; Chapter 2 includes a moderate discussion on monoamine oxidase inhibitors and a rather complete coverage of the tricyclic antidepressants.

Volume 4 also contains two chapters of about equal length. Most of Chapter 1 is devoted to the amphetamines and related compounds, with the remainder including the xanthines and pentylenetetrazol. Chapter 2 mainly covers the phenylethylamine-related compounds, with the balance devoted to tryptamine- and propranolol-related compounds.

Volume 5 covers a mixed group of drugs. Chapter 1 is about 40 percent of the book and includes natural and synthetic narcotics and narcotic antagonists. The balance of Volume 5, Chapter 2, discusses antipyretics, antiinflammatory and antihyperuricemic agents, local anesthetics, and antibiotics. Since these volumes are part of a continuing series, it would have seemed more appropriate to include antibiotics in a volume covering antiinfective and chemotherapeutic agents.

At first glance, from the authors' goals, the reader might expect a combination of an exhaustive treatise and laboratory manual for each subject. An examination of any volume will show that this was not necessary. The general format of each section is: (*a*) a general literature review including the chemistry and biochemical transformation of the drug class under discussion; (*b*) a discussion of derivatization, sensitivity, and quantitation; and (*c*) several specific examples. A limited number of actual procedures is found in the latter part of each chapter. All information is well referenced. Perhaps the best way to describe this series is to say that each chapter is a very extensive review article.

Unless an individual is an analytical laboratory director, there is little reason to purchase the entire set. On the other hand, individual volumes are highly recommended to scientists needing to be knowledgeable in the analysis of a specific drug group. The entire set should be purchased by libraries whose collections include books dealing with instrumental analysis.

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Aromatic and Heteroaromatic Chemistry, Volume 6. A Review of the Literature Abstracted between 7/76 and 6/77. By H. SUSCHITZKY and O. METH-COHN. Chemical Society, Burlington House, London, W1V OBN, England. 1978. 326 pp. 14 × 22 cm. Price $47.50.

This latest volume in the series of Specialist Periodical Reports reviews the literature on aromatic and heteroaromatic chemistry abstracted between July 1976 and June 1977 and covered by Volumes 85 and 86 of *Chemical Abstracts*.

The two new senior reporters, Professors Suschitzky and Meth-Cohn, have partially reorganized the chapters of this volume in an attempt to reduce the cost and to aid the reader in locating particular topics quickly, in the absence of a subject index. The high cost and lack of a subject index were the only previous criticisms of this series. The reorganization was successful in both endeavors, although the cost of the book is still relatively high.

The senior reporters have retained all other aspects developed by their predecessors, Professors Bird and Cheeseman, and have maintained the high quality presentation of a large amount of factual information so valuable to the scientist interested in this area.

The liberal use of structures and reaction schemes and the practice of placing references as footnotes on the page cited have been retained and maintain the excellent readability and continuity of the previous volumes.

The new chapter titles include: Three and Four-Membered Ring Systems; Five-Membered Ring Systems; Six-Membered Ring Systems; Six-Membered Heterocycles; Seven-Membered Ring Systems; Medium-Sized Rings and Macrocycles; and Electrophilic Substitution Reactions. Chapter titles retained include: Nucleophilic Substitution Reactions; Aromatic Substitution by Free Radicals, Carbenes, and Nitrenes; Porphyrins and Related Compounds; Naturally Occurring Aromatic Oxygen-Ring Compounds; and Other Naturally Occurring Aromatic Compounds. Not included, due to the illness of its reporter, was the new chapter entitled Six-Membered Homocycles. The volume has a complete author index containing over 4300 names, and the 11 chapters include over 2200 literature citations.

Like the previous volumes, this one provides a systematic, critical, in-depth account of the progress in aromatic and heteroaromatic chemistry.

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Analysis of Steroid Hormone Drugs. By S. GÖRÖG and GY. SZÁSZ. Akadémie Kiadó, Budapest, Hungary, and Elsevier Scientific Publishing Co., Amsterdam, The Netherlands. 1978. 426 pp. Price $59.

Every scientist interested in the analysis of steroid pharmaceuticals should acquire this book. The literature on steroid analysis has become so extensive that many review articles have degenerated into mere taxonomy, like the bienniel *Analytical Chemistry* reviews on drug analysis. In contrast, this book provides an informed and intelligent review of the subject. It is a volume one can read through as a text, browse in for intellectual stimulation, or use as a reference for a specific question.

Organization of the book could well serve as a paradigm for other monographs. The chapters are titled, "Fundamental Steroid Hormone Chemistry," "Brief Outline of the Therapeutic Use of Steroid Hormones," "Development of, and Current Trends in, Methods of Steroid Hormone Analysis," "Chromatography of Steroid Hormones," "Gas Chromatography of Steroid Hormones," "Functional Group Analysis," "Assay of Dosage Forms," and "Analysis of Raw Materials for the Semi-syntheses of Steroid Hormones." The author of each chapter or section is identified, and each chapter has references. There are author and subject indexes.

HPLC methods now are probably the most useful for assay of steroids and their pharmaceutical dosage forms. Discussion of this technique in the book is much shorter than for GC, which it has largely supplanted. Nevertheless, the text is oriented to chemical principles, so it is unlikely to be dated rapidly by the appearance of new technology.

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